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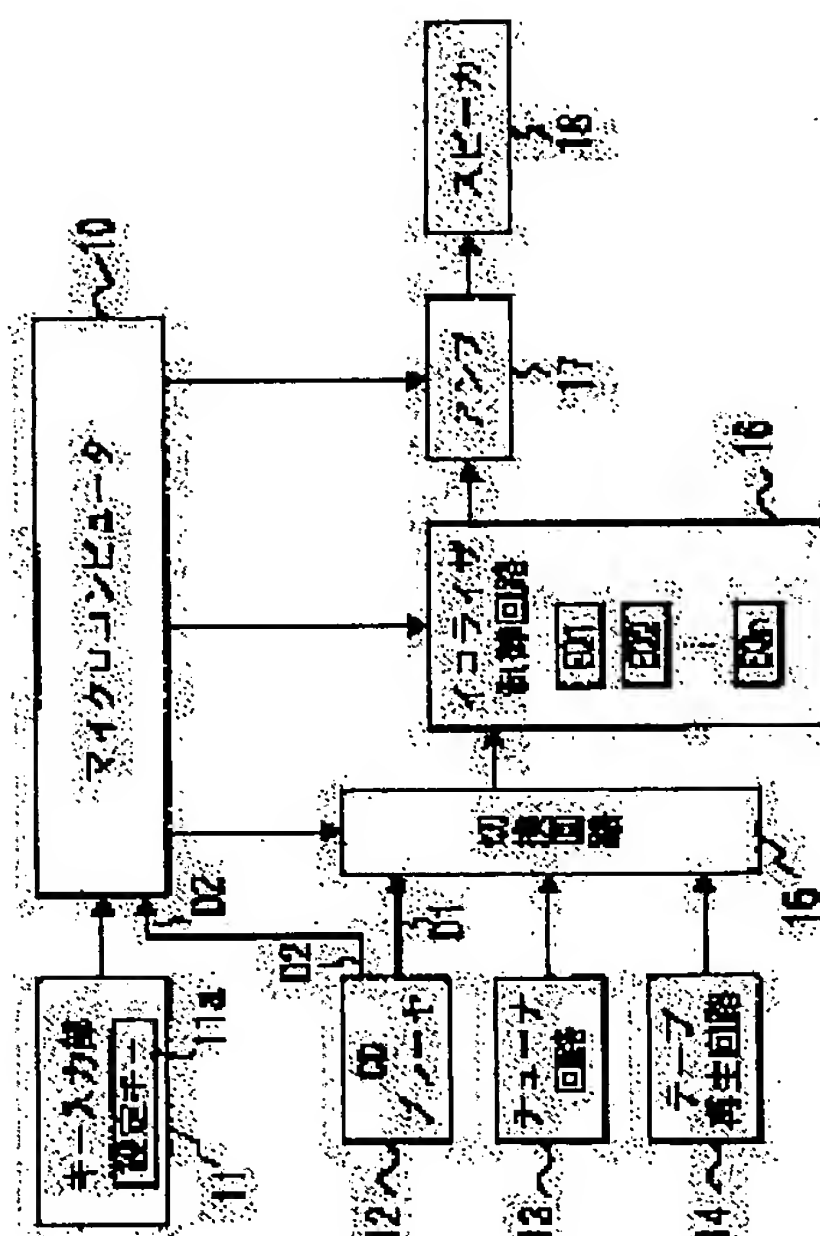
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(54) CD REPRODUCING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a CD reproducing device capable of performing the correcting of an equalizer automatically in accordance with genres of pieces of music of a played CD.

SOLUTION: This reproducing device is constituted so that operation commanding signals from a key input part 11 are supplied to a microcomputer 10 for compositely controlling the whole of the player. Then, the reproducing device has three systems of sound sources of a CD player 12, a tuner circuit 13 and a tape reproducing circuit 14 and outputs of these systems are inputted to a changeover circuit 15. In the poststage of the circuit 15, an equalizer control circuit 16 and an amplifier 17 are successively connected and a speaker 18 is connected to the output end of the amplifier 17. The equalizer control circuit 16 performs the correcting of the frequency characteristic of an equalizer automatically based on the data of selected equalizer characteristics EQ1 to EQn taken out from the inside of a memory in which data of plural equalizer characteristics Q1 to Qn which are preset are stored.



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CLAIMS

[Claim(s)]

[Claim 1]In a CD reproduction device which amends a frequency characteristic and is outputted based on selection equalizer characteristic data taken out out of a memory in which two or more equalizer characteristic data beforehand set as an audio signal acquired by reading recorded information on CD was stored, When recorded information on said CD is read and a music genre code is obtained, A CD reproduction device establishing an equalizer control means which ***** amendment of a frequency characteristic based on selection equalizer characteristic data taken out out of said memory corresponding to this music genre code to said audio signal.

[Claim 2]The CD reproduction device according to claim 1, wherein stored data of said memory is constituted including equalizer characteristic data beforehand set up corresponding to each of two or more music genre codes.

[Claim 3]The CD reproduction device according to claim 1, wherein stored data of said memory is constituted including equalizer characteristic data arbitrarily set up corresponding to each of two or more music genre codes.

[Claim 4]The CD reproduction device according to claim 1, wherein stored data of said memory is constituted including equalizer characteristic data set up corresponding to sound reproduction environment.

[Claim 5]When it had two or more CDs, and carrying out CD exchange and a music genre code is obtained, The CD reproduction device according to any one of claims 1 to 4 constituting so that equalizer characteristic data corresponding to the music genre code concerned may be taken out out of said memory and a frequency characteristic may be amended.

[Claim 6]The CD reproduction device according to any one of claims 1 to 5, wherein said equalizer control means is constituted so that the digital equalizer characteristic may be amended to an audio signal of a gestalt of a digital signal.

[Claim 7]The CD reproduction device according to any one of claims 1 to 5, wherein said equalizer control means is constituted so that the analog equalizer characteristic may be amended to an audio signal of a gestalt of an analog signal.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]Especially this invention relates to the CD reproduction device which amends a frequency characteristic and is outputted based on the selection equalizer characteristic data taken out of the memory in which two or more equalizer characteristic data beforehand set as the audio signal acquired by reading the recorded information on CD was stored about a CD reproduction device.

[0002]

[Description of the Prior Art]There is an advantage of the handling of CD being convenient and being able to perform promptly neither search of music nor access of the music wishing playback, or degradation of the face of a board hardly arising, since it is optical uncontacted reading, and. Since it was high-quality sound, had spread widely and music number data was mainly recorded on the sub-code area at the beginning of development, but. Recent years come and in the sub-code area concerned The album title of CD, a music title, Text data, such as a performer's name (or performance group name), also comes to be recorded, and the data of music genre information, for example, classic music, popular music, and jazz music, vocal music, karaoke music, etc. has also come to be recorded further.

[0003]When playing the audio signal acquired by reading the recorded information on CD when playing such CD by the loudspeaker or headphone, it is common to carry out sound reproduction, where amendment by an equalizer is performed corresponding to the frequency characteristic of a loudspeaker or headphone. As for the amendment by an equalizer, it is desirable to change the frequency characteristic according to a music genre.

[0004]For example, it is that the direction which does not have a frequency band which carries out the increase in a gain extremely in reproduction of classic music suits a user's liking, and the direction which makes the gain of a vocal frequency band increase in the case of vocal music suits a user's liking etc. The correction frequency zone and correction amount by an equalizer differ from each other by whether the environment which carries out sound reproduction is usually the interior of a room, it is the interior of a room where special sound construction was carried out, or it is automatic in the car.

[0005]therefore, it is very complicated operation to boil equalizer amendment each time and to set it up according to playback music, and since it is not efficient, it has the CD reproduction device which was made to perform equalizer amendment somewhat automatically.

[0006]The 1st example is the art indicated by JP,2-55444,A, and it is an example of application to the CD reproduction device of the form (auto change CD play) which takes out CD from the magazine by which two or more CDs were stored selectively, and is played, The data of each "amendment of volume setting out and a frequency characteristic" of two or more CDs stored by the magazine is beforehand stored in the memory, When playing one selected CD, the data of "amendment of volume setting out and a frequency characteristic" is taken out out of the memory concerned, and it constitutes so that it may amend automatically.

[0007]If it has two or more magazines and the data of "amendment of volume setting out and a frequency characteristic" is stored in the memory also to storage CD of each magazine, it can be made to correspond also to CD exchange in a magazine unit.

[0008]the 2nd example being the art indicated by JP,2-135961,A, storing in a memory "the content data and its equalizer characteristic data" in CD played by the self-opportunity, saving them as playback historical data, and, When the CD concerned is played by after an appropriate time, it amends so that playback historical data may be searched, associated data may be found and it may become the equalizer characteristic corresponding

to the found data.

[0009]Therefore, it is not necessary to reset the equalizer characteristic, and in the case of CD played before, since the different equalizer characteristic for every CD moreover played can reappear easily, comfortable sound reproduction can be performed.

[0010]Now, as the 3rd example, there is multifunctional playback equipment (CD radio cassette recorder) as shown in drawing 4. That is, the microcomputer (it is hereafter called a "microcomputer" for short) 1 for controlling the whole device complexly is formed, and it is constituted so that the operating command signal from the key input section 2 may be supplied to this microcomputer 1. This key input section 2 is formed by many keys (not shown), such as various keys for operating commands, and a ten key, and is constituted including the equalizer set key 2a.

[0011]It has three sound sources, CD player 3, the tuner circuit 4, and the tape reproduction circuit 5, and these outputs are inputted into the switch circuit 6. The equalizer control circuit 7 and the amplifier 8 are connected to the latter part of this switch circuit 6 one by one, and the loudspeaker 9 is connected to the outgoing end of the amplifier 8. Each of these switch circuits 6, the equalizer control circuit 7, and the amplifier 8 is constituted so that motion control may be suitably carried out by the instructions from the microcomputer 1.

[0012]The equalizer control circuit 7 has a memory which stores the equalizer characteristic data EQ1-EQn of plurality (n pieces) in the inside, and by operating the equalizer set key 2a of the key input section 2, etc., the data concerned is constituted so that it can preset arbitrarily. It is because the key input section 2 is formed by the plural keys for ordering it the CD reproduction operation in CD player 3, or ordering it the change in the gain in the amplifier 6 and various command signals are sent out to the microcomputer 1, CD player 3 performs playback of the music tracks recorded on CD based on an operating command with the microcomputer 1, and sends out an analog voice output signal to the switch circuit 6.

[0013]The switch circuit 6 chooses either of two or more input systems, outputs it to the input edge of the equalizer control circuit 5, and outputs either of the output signal of CD player 3, the output signal of the tuner circuit 4, and the output signal of the tape reproduction circuit 5 based on the instructions from the microcomputer 1.

[0014]The equalizer control circuit 5 is what carries out equalizer amendment with either of the equalizer characteristics EQ1-EQn set as the signal outputted from the switch circuit 6 by the equalizer set key 2a etc., The output of the equalizer control circuit 7 is amplified with the amplifier 8 amplified by the gain based on the instructions from the microcomputer 1, the output is supplied to the loudspeaker 7, and output power of sound is obtained.

[0015]It follows, The characteristic of the equalizer which agrees in the state of the music at each time which performs reproduction by CD player 3 by the equalizer set key 2a. Sound reproduction can be carried out by inputting in the state where took out equalizer characteristic EQ1 - EQn data out of the equalizer control circuit 7, and it was amended according to it.

[0016]

[Problem(s) to be Solved by the Invention]The above conventional CD reproduction devices in the case of said 1st example, The data of each "amendment of a frequency characteristic" of two or more CDs which preceded playing CD and were stored by the magazine is beforehand stored in the memory, Since it is constituted so that the data of "amendment of a frequency characteristic" may be taken out and it may amend automatically out of the memory concerned when playing one selected CD, when storing CD at a magazine, the difficulty of charge in trouble is to the stored data input to a memory.

[0017]When in the case of said 2nd example the "equalizer characteristic data" in CD played by the self-opportunity is stored in a memory, it saves as playback historical data and the CD concerned is played by after an appropriate time, Since it is constituted so that reproduction historical data may be searched, associated data may be found, it may become the equalizer characteristic corresponding to the found data and it may amend, About CD played by the 2nd times, there is a difficulty that trouble starts the data input for storing in a memory at the first time of what can amend automatically.

[0018]Since it has amended so that equalizer characteristic data may be taken out out of an equalizer control circuit and it may become the desired equalizer characteristic by operating that it is also with hand control about operation keys, such as an equalizer set key, according to the music genre of CD currently played in the case of said 3rd example, Since it is amendment in the hand control of what can amend only by the correspondence relation between the music genre of CD, and two or more equalizer characteristic data,

trouble starts, and there is a difficulty that it cannot concentrate on sound reproduction.

[0019]Then, the purpose of this invention is to provide the CD reproduction device which can amend an equalizer automatically corresponding to the music genre of played CD.

[0020]

[Means for Solving the Problem]In order to solve the above-mentioned technical problem, the following characteristic composition is used for a CD reproduction device by this invention.

[0021](1) In a CD reproduction device which amends a frequency characteristic and is outputted based on selection equalizer characteristic data taken out out of a memory in which two or more equalizer characteristic data beforehand set as an audio signal acquired by reading recorded information on CD was stored, When recorded information on said CD is read and a music genre code is obtained, an equalizer control means which ***** amendment of a frequency characteristic based on selection equalizer characteristic data taken out out of said memory corresponding to this music genre code to said audio signal is established.

[0022](2) Constitute stored data of a memory of the above (1) including equalizer characteristic data beforehand set up corresponding to each of two or more music genre codes.

[0023](3) Constitute stored data of a memory of the above (1) including equalizer characteristic data arbitrarily set up corresponding to each of two or more music genre codes.

[0024](4) Constitute stored data of a memory of the above (1) including equalizer characteristic data set up corresponding to sound reproduction environment.

[0025](5) When it has two or more CDs, CD exchange of the composition of the above (1) thru/or the above (4) either is carried out and a music genre code is obtained, constitute so that equalizer characteristic data corresponding to the music genre code concerned may be taken out out of said memory and a frequency characteristic may be amended.

[0026](6) Constitute an equalizer control means of the above (1) thru/or the above (5) either so that the digital equalizer characteristic may be amended to an audio signal of a gestalt of a digital signal.

[0027](7) Constitute an equalizer control means of the above (1) thru/or the above (5) either so that the analog equalizer characteristic may be amended to an audio signal of a gestalt of an analog signal.

[0028]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described using drawing 1 thru/or drawing 3. Drawing 1 is a block circuit diagram showing the 1 embodiment of the example which applied the CD reproduction device by this invention to multifunctional playback equipment (CD radio cassette recorder), The microcomputer 10 for controlling the whole device complexly is formed, and it is constituted so that the operating command signal from the key input section 11 may be supplied to this microcomputer 10. This key input section 11 is formed by many keys (not shown), such as various keys for operating commands, and a ten key, and is constituted including the equalizer set key 11a.

[0029]It has three sound sources, CD player 12, the tuner circuit 13, and the tape reproduction circuit 14, and these outputs are inputted into the switch circuit 15. The equalizer control circuit 16 and the amplifier 17 are connected to the latter part of this switch circuit 15 one by one, and the loudspeaker 18 is connected to the outgoing end of the amplifier 17. Each of these switch circuits 15, the equalizer control circuit 16, and the amplifier 17 is constituted so that motion control may be suitably carried out by the instructions from the microcomputer 10.

[0030]The equalizer control circuit 16 to the audio signal acquired by reading the recorded information on CD. It is what amends a frequency characteristic and is outputted based on the selection equalizer characteristic data taken out out of the memory in which the data of two or more equalizer characteristics Q1-EQn set up beforehand was stored, When recorded information is decoded and a "music genre code" is obtained with the microcomputer 10, the text data D2 incidental to the music data D1 obtained by CD player 12, The equalizer control means which outputs amendment of the frequency characteristic based on the selection equalizer characteristic data taken out out of the memory of equalizer characteristic EQ1 - EQn data corresponding to ** "music genre code" to the output signal from the switch circuit 15 at the ***** amplifier 17 side is constituted.

[0031]It has a memory which stores the equalizer characteristic data EQ1-EQn of plurality (n pieces) in the inside of the equalizer control circuit 16, and by operating the equalizer set key 11a of the key input section 11, etc., the data concerned is constituted so that it can preset arbitrarily. It is because the key input section 11 is formed by the plural keys for ordering it the CD reproduction operation in CD player 12, or ordering it the

change in the gain in the amplifier 17 and various command signals are sent out to the microcomputer 10, CD player 12 performs playback of the music tracks recorded on CD based on an operating command with the microcomputer 1, and sends out the data D1 to the switch circuit 15, and it sends out the text data D2 to the microcomputer 10.

[0032]The switch circuit 15 is what chooses either of two or more input systems, and is outputted to the input edge of the equalizer control circuit 16, That is, either of the output signal of CD player 12, the output signal of the tuner circuit 13, and the output signal of the tape reproduction circuit 14 is outputted based on the instructions from the microcomputer 10.

[0033]The equalizer control circuit 5 is what carries out equalizer amendment with either of the equalizer characteristics EQ1-EQn set as the signal outputted from the switch circuit 6 by the equalizer set key 2a etc., The output of the equalizer control circuit 7 is amplified with the amplifier 8 amplified by the gain based on the instructions from the microcomputer 1, the output is supplied to the loudspeaker 7, and output power of sound is obtained.

[0034]Operation of processing of CD play ** in the CD reproduction device constituted as mentioned above is explained using the flow chart shown in drawing 2. De Dis Claude of CD is first performed at Step S1, optical focus servo and tracking servo in the read head, and spindle servo are performed at the following step S2, and read-out of the TOC data of CD sub-code field and TEXT data is performed at the following step S3.

[0035]In the following step S4, it is judged whether there is any music genre code as TEXT data read at Step S3, when it is Yes, transmission (signal transduction from CD player 12 to the microcomputer 10) of a music genre code is performed at Step S5, and it progresses to the following step S6.

[0036]When the push operation of the key input section 11 (equalizer set-key 11a it contains) occurs, Step S6, For example, the operating command is performed to cases -- the operation key which carries out the starting command of the music playback of the next number under present playback of CD was pressed -- it is judged whether there is any demand of disk-swapping at the following step S7, and when it is returned to Step S6 when it is No, and it is alike again and the operation key is pressed, the operating command is performed. and when are set to Yes at Step S7, and putting in another way and there is a demand which exchanges CD under present playback, it is returned to Step S1, and above-mentioned Step S1 - Step S8 are alike again, and cotton is performed.

[0037]Next, operation of the equalizer control management in the equalizer control circuit 16 is explained using the flow chart shown in drawing 3. First, it is judged whether there is any input of the equalizer set key 11a by step S9, In Yes, equalizer amendment is performed to the output of the switch circuit 15 by either of the data of the equalizer characteristics EQ1-EQn set up by the equalizer set key 11a of the key input section 11, etc. (set-up data).

[0038]On the other hand, in No, it progresses by step S9 at Step S10, Judge whether it is a case where the music genre code is contained in the text data D2 which the music genre code was received (the text data D2 obtained with CD player 12 is signal transduction to the microcomputer 10), and was obtained with CD player 12, and, in No, it is returned at step S9, In Yes, the equalizer characteristic corresponding to the received music genre code is looked for out of equalizer characteristic EQ1 of the equalizer control circuit 16 - EQn data, the found data of the equalizer characteristic is also -- the output signal of the switch circuit 15 -- equalizer amendment -- ***** -- equalizer amendment is automatically carried out in music genre code of CD by things. After processing of Steps S11 and S12 returns to processing of step S9.

[0039]The above-mentioned gestalt is constituted so that the analog equalizer characteristic may be amended to the audio signal of the gestalt of an analog signal, but the equalizer control circuit 16. As for this invention, it is needless to say that it may constitute so that the digital equalizer characteristic may be amended to the audio signal of the gestalt of a digital signal, without being limited to this.

[0040]As for the CD reproduction device of this invention, it is needless to say that it is applicable not only to the CD player which can play one CD but the multiple disk player which stored two or more CDs.

[0041]

[Effect of the Invention]As explained above, the CD reproduction device of this invention, When the recorded information on CD is read and a music genre code is obtained, amendment of the frequency characteristic based on the selection equalizer characteristic data taken out out of said memory corresponding to this music genre code, Since it constitutes so that the equalizer control means which ***** to said audio signal may be established, when storing CD at the magazine in the multiple disk player which stored two or more CDs, there is an advantage where the stored data input to a memory becomes unnecessary at all.

[0042]When the "equalizer characteristic data" in CD played by the self-opportunity is stored in a memory, it saves as playback historical data and the CD concerned is played by after an appropriate time, When it constitutes so that playback historical data may be searched, associated data may be found, it may become the equalizer characteristic corresponding to the found data and it may amend, about CD played by the 2nd times, can amend automatically, and. The first time has an advantage whose necessity for the data input for storing in a memory is lost.

[0043]It amends so that equalizer characteristic data may be taken out out of an equalizer control circuit and it may become the desired equalizer characteristic by operating that it is also with hand control about operation keys, such as an equalizer set key, according to the music genre of CD currently played, Since it is not necessary to perform the thing which trouble starts very much of amending only by the correspondence relation between the music genre of CD, and two or more equalizer characteristic data, there is an advantage that it can concentrate on comfortable sound reproduction.

[0044]Therefore, according to this invention, the CD reproduction device which can amend an equalizer automatically corresponding to the music genre of played CD can be provided.

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TECHNICAL FIELD

[Field of the Invention]Especially this invention relates to the CD reproduction device which amends a frequency characteristic and is outputted based on the selection equalizer characteristic data taken out out of the memory in which two or more equalizer characteristic data beforehand set as the audio signal acquired by reading the recorded information on CD was stored about a CD reproduction device.

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PRIOR ART

[Description of the Prior Art]There is an advantage of the handling of CD being convenient and being able to perform promptly neither search of music nor access of the music wishing playback, or degradation of the face of a board hardly arising, since it is optical uncontacted reading, and. Since it was high-quality sound, had spread widely and music number data was mainly recorded on the sub-code area at the beginning of development, but. Recent years come and in the sub-code area concerned The album title of CD, a music title, Text data, such as a performer's name (or performance group name), also comes to be recorded, and the data of music genre information, for example, classic music, popular music, and jazz music, vocal music, karaoke music, etc. has also come to be recorded further.

[0003]When playing the audio signal acquired by reading the recorded information on CD when playing such CD by the loudspeaker or headphone, it is common to carry out sound reproduction, where amendment by an equalizer is performed corresponding to the frequency characteristic of a loudspeaker or headphone. As for the amendment by an equalizer, it is desirable to change the frequency characteristic according to a music genre.

[0004]For example, it is that the direction which does not have a frequency band which carries out the increase in a gain extremely in reproduction of classic music suits a user's liking, and the direction which makes the gain of a vocal frequency band increase in the case of vocal music suits a user's liking etc. The correction frequency zone and correction amount by an equalizer differ from each other by whether the environment which carries out sound reproduction is usually the interior of a room, it is the interior of a room where special sound construction was carried out, or it is automatic in the car.

[0005]therefore, it is very complicated operation to boil equalizer amendment each time and to set it up according to playback music, and since it is not efficient, it has the CD reproduction device which was made to perform equalizer amendment somewhat automatically.

[0006]The 1st example is the art indicated by JP,2-55444,A, and it is an example of application to the CD reproduction device of the form (auto change CD play) which takes out CD from the magazine by which two or more CDs were stored selectively, and is played, The data of each "amendment of volume setting out and a frequency characteristic" of two or more CDs stored by the magazine is beforehand stored in the memory, When playing one selected CD, the data of "amendment of volume setting out and a frequency characteristic" is taken out out of the memory concerned, and it constitutes so that it may amend automatically.

[0007]If it has two or more magazines and the data of "amendment of volume setting out and a frequency characteristic" is stored in the memory also to storage CD of each magazine, it can be made to correspond also to CD exchange in a magazine unit.

[0008]the 2nd example being the art indicated by JP,2-135961,A, storing in a memory "the content data and its equalizer characteristic data" in CD played by the self-opportunity, saving them as playback historical data, and, When the CD concerned is played by after an appropriate time, it amends so that playback historical data may be searched, associated data may be found and it may become the equalizer characteristic corresponding to the found data.

[0009]Therefore, it is not necessary to reset the equalizer characteristic, and in the case of CD played before, since the different equalizer characteristic for every CD moreover played can reappear easily, comfortable sound reproduction can be performed.

[0010]Now, as the 3rd example, there is multifunctional playback equipment (CD radio cassette recorder) as shown in drawing 4. That is, the microcomputer (it is hereafter called a "microcomputer" for short) 1 for controlling the whole device complexly is formed, and it is constituted so that the operating command signal

from the key input section 2 may be supplied to this microcomputer 1. This key input section 2 is formed by many keys (not shown), such as various keys for operating commands, and a ten key, and is constituted including the equalizer set key 2a.

[0011]It has three sound sources, CD player 3, the tuner circuit 4, and the tape reproduction circuit 5, and these outputs are inputted into the switch circuit 6. The equalizer control circuit 7 and the amplifier 8 are connected to the latter part of this switch circuit 6 one by one, and the loudspeaker 9 is connected to the outgoing end of the amplifier 8. Each of these switch circuits 6, the equalizer control circuit 7, and the amplifier 8 is constituted so that motion control may be suitably carried out by the instructions from the microcomputer 1.

[0012]The equalizer control circuit 7 has a memory which stores the equalizer characteristic data EQ1-EQn of plurality (n pieces) in the inside, and by operating the equalizer set key 2a of the key input section 2, etc., the data concerned is constituted so that it can preset arbitrarily. It is because the key input section 2 is formed by the plural keys for ordering it the CD reproduction operation in CD player 3, or ordering it the change in the gain in the amplifier 6 and various command signals are sent out to the microcomputer 1, CD player 3 performs playback of the music tracks recorded on CD based on an operating command with the microcomputer 1, and sends out an analog voice output signal to the switch circuit 6.

[0013]The switch circuit 6 chooses either of two or more input systems, outputs it to the input edge of the equalizer control circuit 5, and outputs either of the output signal of CD player 3, the output signal of the tuner circuit 4, and the output signal of the tape reproduction circuit 5 based on the instructions from the microcomputer 1.

[0014]The equalizer control circuit 5 is what carries out equalizer amendment with either of the equalizer characteristics EQ1-EQn set as the signal outputted from the switch circuit 6 by the equalizer set key 2a etc., The output of the equalizer control circuit 7 is amplified with the amplifier 8 amplified by the gain based on the instructions from the microcomputer 1, the output is supplied to the loudspeaker 7, and output power of sound is obtained.

[0015]It follows, The characteristic of the equalizer which agrees in the state of the music at each time which performs reproduction by CD player 3 by the equalizer set key 2a. Sound reproduction can be carried out by inputting in the state where took out equalizer characteristic EQ1 - EQn data out of the equalizer control circuit 7, and it was amended according to it.

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EFFECT OF THE INVENTION

[Effect of the Invention]As explained above, the CD reproduction device of this invention, When the recorded information on CD is read and a music genre code is obtained, amendment of the frequency characteristic based on the selection equalizer characteristic data taken out out of said memory corresponding to this music genre code, Since it constitutes so that the equalizer control means which ***** to said audio signal may be established, when storing CD at the magazine in the multiple disk player which stored two or more CDs, there is an advantage where the stored data input to a memory becomes unnecessary at all.

[0042]When the "equalizer characteristic data" in CD played by the self-opportunity is stored in a memory, it saves as playback historical data and the CD concerned is played by after an appropriate time, When it constitutes so that playback historical data may be searched, associated data may be found, it may become the equalizer characteristic corresponding to the found data and it may amend, about CD played by the 2nd times, can amend automatically, and. The first time has an advantage whose necessity for the data input for storing in a memory is lost.

[0043]It amends so that equalizer characteristic data may be taken out out of an equalizer control circuit and it may become the desired equalizer characteristic by operating that it is also with hand control about operation keys, such as an equalizer set key, according to the music genre of CD currently played, Since it is not necessary to perform the thing which trouble starts very much of amending only by the correspondence relation between the music genre of CD, and two or more equalizer characteristic data, there is an advantage that it can concentrate on comfortable sound reproduction.

[0044]Therefore, according to this invention, the CD reproduction device which can amend an equalizer automatically corresponding to the music genre of played CD can be provided.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]The above conventional CD reproduction devices in the case of said 1st example, The data of each "amendment of a frequency characteristic" of two or more CDs which preceded playing CD and were stored by the magazine is beforehand stored in the memory, Since it is constituted so that the data of "amendment of a frequency characteristic" may be taken out and it may amend automatically out of the memory concerned when playing one selected CD, when storing CD at a magazine, the difficulty of charge in trouble is to the stored data input to a memory.

[0017]When in the case of said 2nd example the "equalizer characteristic data" in CD played by the self-opportunity is stored in a memory, it saves as playback historical data and the CD concerned is played by after an appropriate time, Since it is constituted so that reproduction historical data may be searched, associated data may be found, it may become the equalizer characteristic corresponding to the found data and it may amend, About CD played by the 2nd times, there is a difficulty that trouble starts the data input for storing in a memory at the first time of what can amend automatically.

[0018]Since it has amended so that equalizer characteristic data may be taken out out of an equalizer control circuit and it may become the desired equalizer characteristic by operating that it is also with hand control about operation keys, such as an equalizer set key, according to the music genre of CD currently played in the case of said 3rd example, Since it is amendment in the hand control of what can amend only by the correspondence relation between the music genre of CD, and two or more equalizer characteristic data, trouble starts, and there is a difficulty that it cannot concentrate on sound reproduction.

[0019]Then, the purpose of this invention is to provide the CD reproduction device which can amend an equalizer automatically corresponding to the music genre of played CD.

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MEANS

[Means for Solving the Problem]In order to solve the above-mentioned technical problem, the following characteristic composition is used for a CD reproduction device by this invention.

[0021](1) In a CD reproduction device which amends a frequency characteristic and is outputted based on selection equalizer characteristic data taken out out of a memory in which two or more equalizer characteristic data beforehand set as an audio signal acquired by reading recorded information on CD was stored, When recorded information on said CD is read and a music genre code is obtained, an equalizer control means which ***** amendment of a frequency characteristic based on selection equalizer characteristic data taken out out of said memory corresponding to this music genre code to said audio signal is established.

[0022](2) Constitute stored data of a memory of the above (1) including equalizer characteristic data beforehand set up corresponding to each of two or more music genre codes.

[0023](3) Constitute stored data of a memory of the above (1) including equalizer characteristic data arbitrarily set up corresponding to each of two or more music genre codes.

[0024](4) Constitute stored data of a memory of the above (1) including equalizer characteristic data set up corresponding to sound reproduction environment.

[0025](5) When it has two or more CDs, CD exchange of the composition of the above (1) thru/or the above (4) either is carried out and a music genre code is obtained, constitute so that equalizer characteristic data corresponding to the music genre code concerned may be taken out out of said memory and a frequency characteristic may be amended.

[0026](6) Constitute an equalizer control means of the above (1) thru/or the above (5) either so that the digital equalizer characteristic may be amended to an audio signal of a gestalt of a digital signal.

[0027](7) Constitute an equalizer control means of the above (1) thru/or the above (5) either so that the analog equalizer characteristic may be amended to an audio signal of a gestalt of an analog signal.

[0028]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described using drawing 1 thru/or drawing 3. Drawing 1 is a block circuit diagram showing the 1 embodiment of the example which applied the CD reproduction device by this invention to multifunctional playback equipment (CD radio cassette recorder), The microcomputer 10 for controlling the whole device complexly is formed, and it is constituted so that the operating command signal from the key input section 11 may be supplied to this microcomputer 10. This key input section 11 is formed by many keys (not shown), such as various keys for operating commands, and a ten key, and is constituted including the equalizer set key 11a.

[0029]It has three sound sources, CD player 12, the tuner circuit 13, and the tape reproduction circuit 14, and these outputs are inputted into the switch circuit 15. The equalizer control circuit 16 and the amplifier 17 are connected to the latter part of this switch circuit 15 one by one, and the loudspeaker 18 is connected to the outgoing end of the amplifier 17. Each of these switch circuits 15, the equalizer control circuit 16, and the amplifier 17 is constituted so that motion control may be suitably carried out by the instructions from the microcomputer 10.

[0030]The equalizer control circuit 16 to the audio signal acquired by reading the recorded information on CD. It is what amends a frequency characteristic and is outputted based on the selection equalizer characteristic data taken out out of the memory in which the data of two or more equalizer characteristics Q1-EQn set up beforehand was stored, When recorded information is decoded and a "music genre code" is obtained with the microcomputer 10, the text data D2 incidental to the music data D1 obtained by CD player 12, The equalizer

control means which outputs amendment of the frequency characteristic based on the selection equalizer characteristic data taken out of the memory of equalizer characteristic EQ1 – EQn data corresponding to ** “music genre code” to the output signal from the switch circuit 15 at the ***** amplifier 17 side is constituted.

[0031]It has a memory which stores the equalizer characteristic data EQ1–EQn of plurality (n pieces) in the inside of the equalizer control circuit 16, and by operating the equalizer set key 11a of the key input section 11, etc., the data concerned is constituted so that it can preset arbitrarily. It is because the key input section 11 is formed by the plural keys for ordering it the CD reproduction operation in CD player 12, or ordering it the change in the gain in the amplifier 17 and various command signals are sent out to the microcomputer 10, CD player 12 performs playback of the music tracks recorded on CD based on an operating command with the microcomputer 1, and sends out the data D1 to the switch circuit 15, and it sends out the text data D2 to the microcomputer 10.

[0032]The switch circuit 15 is what chooses either of two or more input systems, and is outputted to the input edge of the equalizer control circuit 16, That is, either of the output signal of CD player 12, the output signal of the tuner circuit 13, and the output signal of the tape reproduction circuit 14 is outputted based on the instructions from the microcomputer 10.

[0033]The equalizer control circuit 5 is what carries out equalizer amendment with either of the equalizer characteristics EQ1–EQn set as the signal outputted from the switch circuit 6 by the equalizer set key 2a etc., The output of the equalizer control circuit 7 is amplified with the amplifier 8 amplified by the gain based on the instructions from the microcomputer 1, the output is supplied to the loudspeaker 7, and output power of sound is obtained.

[0034]Operation of processing of CD play ** in the CD reproduction device constituted as mentioned above is explained using the flow chart shown in drawing 2. De Dis Claude of CD is first performed at Step S1, optical focus servo and tracking servo in the read head, and spindle servo are performed at the following step S2, and read-out of the TOC data of CD sub-code field and TEXT data is performed at the following step S3.

[0035]In the following step S4, it is judged whether there is any music genre code as TEXT data read at Step S3, when it is Yes, transmission (signal transduction from CD player 12 to the microcomputer 10) of a music genre code is performed at Step S5, and it progresses to the following step S6.

[0036]When the push operation of the key input section 11 (equalizer set-key 11a it contains) occurs, Step S6, For example, the operating command is performed to cases -- the operation key which carries out the starting command of the music playback of the next number under present playback of CD was pressed -- it is judged whether there is any demand of disk-swapping at the following step S7, and when it is returned to Step S6 when it is No, and it is alike again and the operation key is pressed, the operating command is performed. and when are set to Yes at Step S7, and putting in another way and there is a demand which exchanges CD under present playback, it is returned to Step S1, and above-mentioned Step S1 – Step S8 are alike again, and cotton is performed.

[0037]Next, operation of the equalizer control management in the equalizer control circuit 16 is explained using the flow chart shown in drawing 3. First, it is judged whether there is any input of the equalizer set key 11a by step S9, In Yes, equalizer amendment is performed to the output of the switch circuit 15 by either of the data of the equalizer characteristics EQ1–EQn set up by the equalizer set key 11a of the key input section 11, etc. (set-up data).

[0038]On the other hand, in No, it progresses by step S9 at Step S10, Judge whether it is a case where the music genre code is contained in the text data D2 which the music genre code was received (the text data D2 obtained with CD player 12 is signal transduction to the microcomputer 10), and was obtained with CD player 12, and, in No, it is returned at step S9, In Yes, the equalizer characteristic corresponding to the received music genre code is looked for out of equalizer characteristic EQ1 of the equalizer control circuit 16 – EQn data, the found data of the equalizer characteristic is also -- the output signal of the switch circuit 15 -- equalizer amendment -- ***** -- equalizer amendment is automatically carried out in music genre code of CD by things. After processing of Steps S11 and S12 returns to processing of step S9.

[0039]The above-mentioned gestalt is constituted so that the analog equalizer characteristic may be amended to the audio signal of the gestalt of an analog signal, but the equalizer control circuit 16. As for this invention, it is needless to say that it may constitute so that the digital equalizer characteristic may be amended to the audio signal of the gestalt of a digital signal, without being limited to this.

[0040]As for the CD reproduction device of this invention, it is needless to say that it is applicable not only to

the CD player which can play one CD but the multiple disk player which stored two or more CDs.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block circuit diagram of the CD reproduction device by the 1 embodiment of this invention.

[Drawing 2]It is a flow chart for explaining the processing operation which makes importance the portion of the CD player shown in drawing 1.

[Drawing 3]It is a flow chart for explaining the equalizer control management operation which makes importance the portion of the equalizer control circuit shown in drawing 1.

[Drawing 4]It is a block circuit diagram showing the circuitry of an example of the conventional CD reproduction device.

[Description of Notations]

10 Microcomputer

11 Key input section

11a Equalizer set key

12 CD player

13 Tuner circuit

14 Tape reproduction circuit

15 Selector switch circuit

16 Equalizer control circuit

17 Amplifier

18 Loudspeaker

[Translation done.]

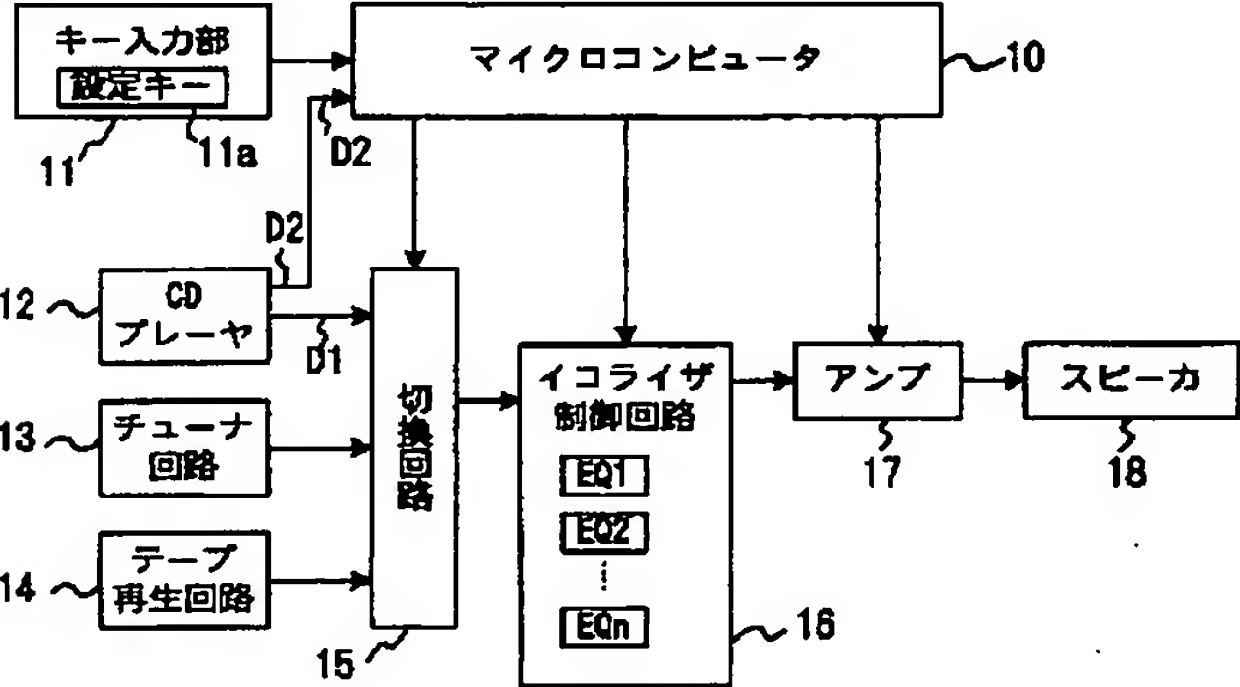
* NOTICES *

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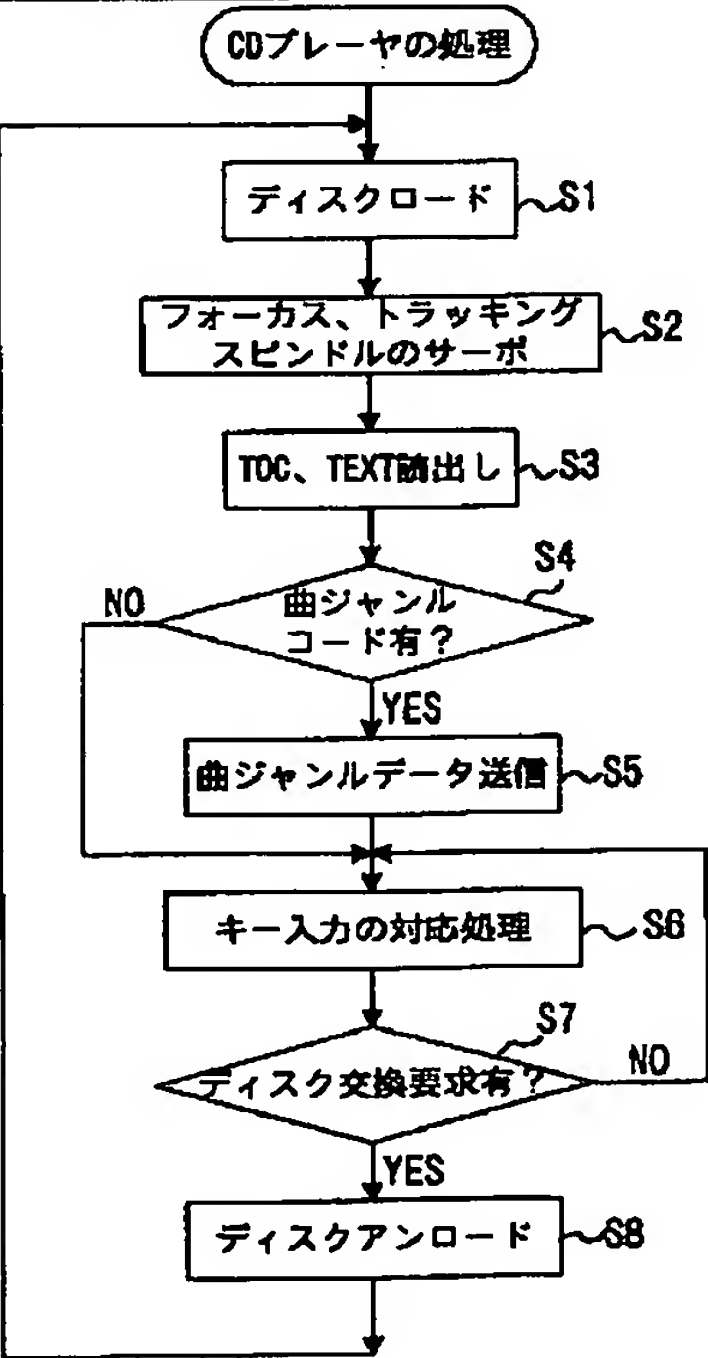
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
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- 3.In the drawings, any words are not translated.

DRAWINGS

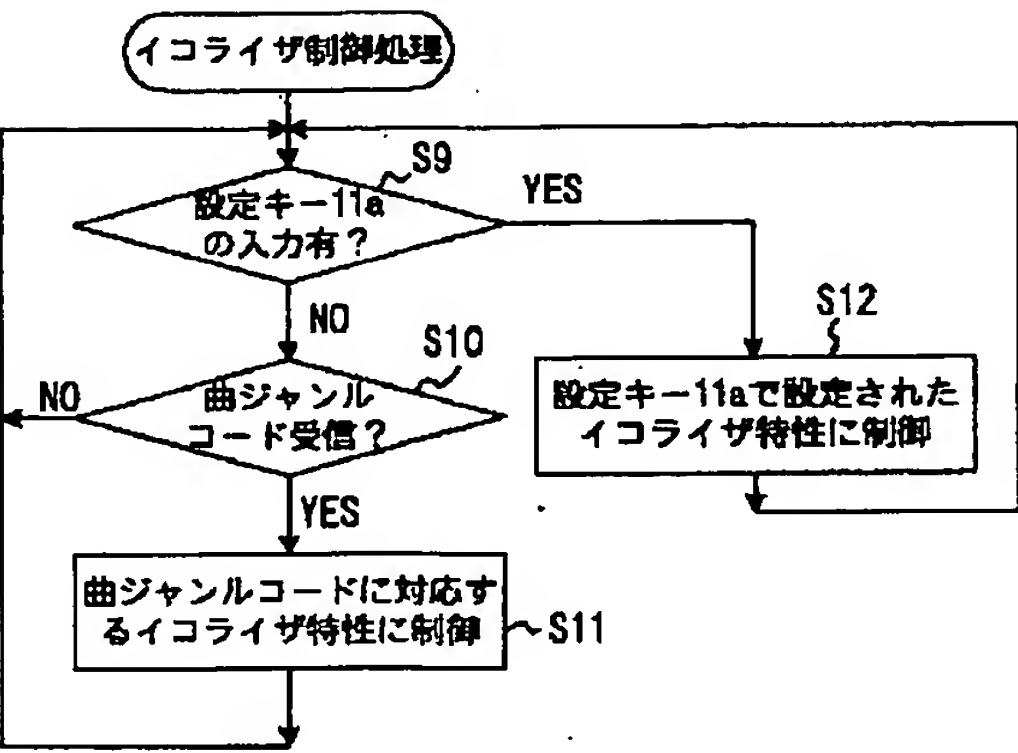
[Drawing 1]



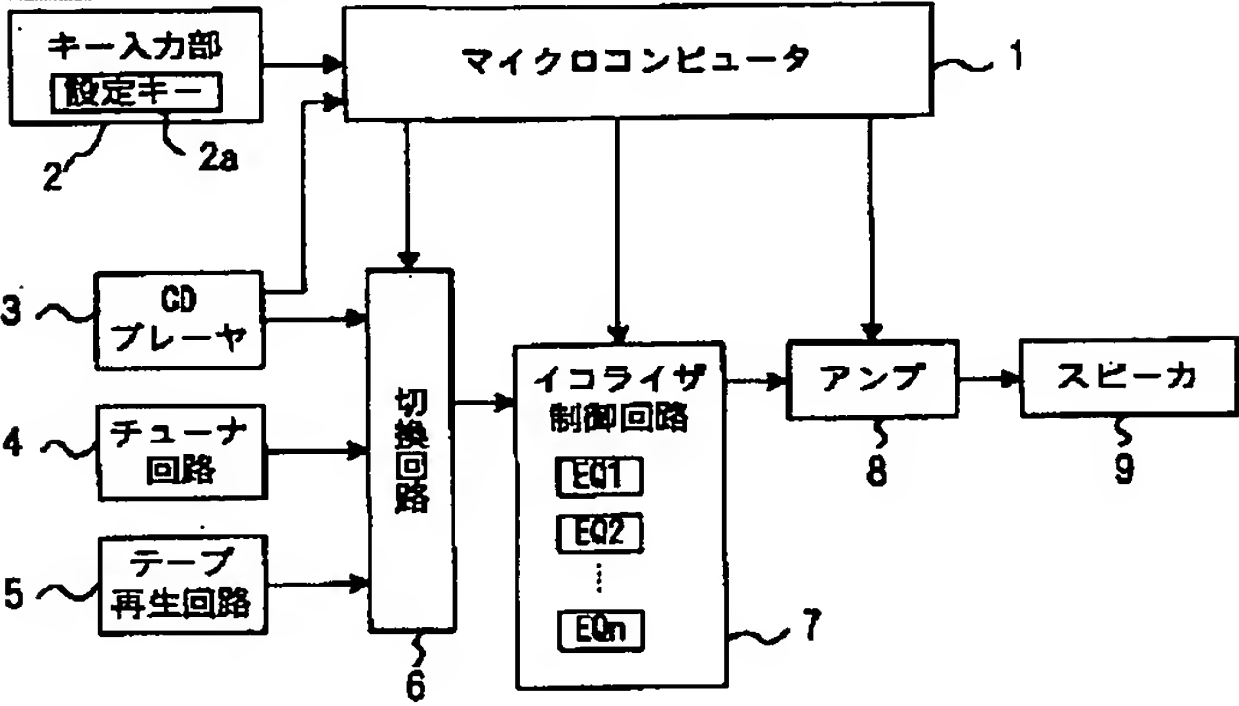
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]

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|--------------------------|-------|---------------|-------------------|
| G 1 1 B 20/10 | 3 2 1 | G 1 1 B 20/10 | 3 2 1 Z 5 D 0 2 0 |
| H 0 3 G 5/16 | | H 0 3 G 5/16 | A 5 D 0 4 4 |
| H 0 4 R 3/04 | | H 0 4 R 3/04 | 5 J 0 3 0 |

審査請求 未請求 請求項の数7 O L (全 6 頁)

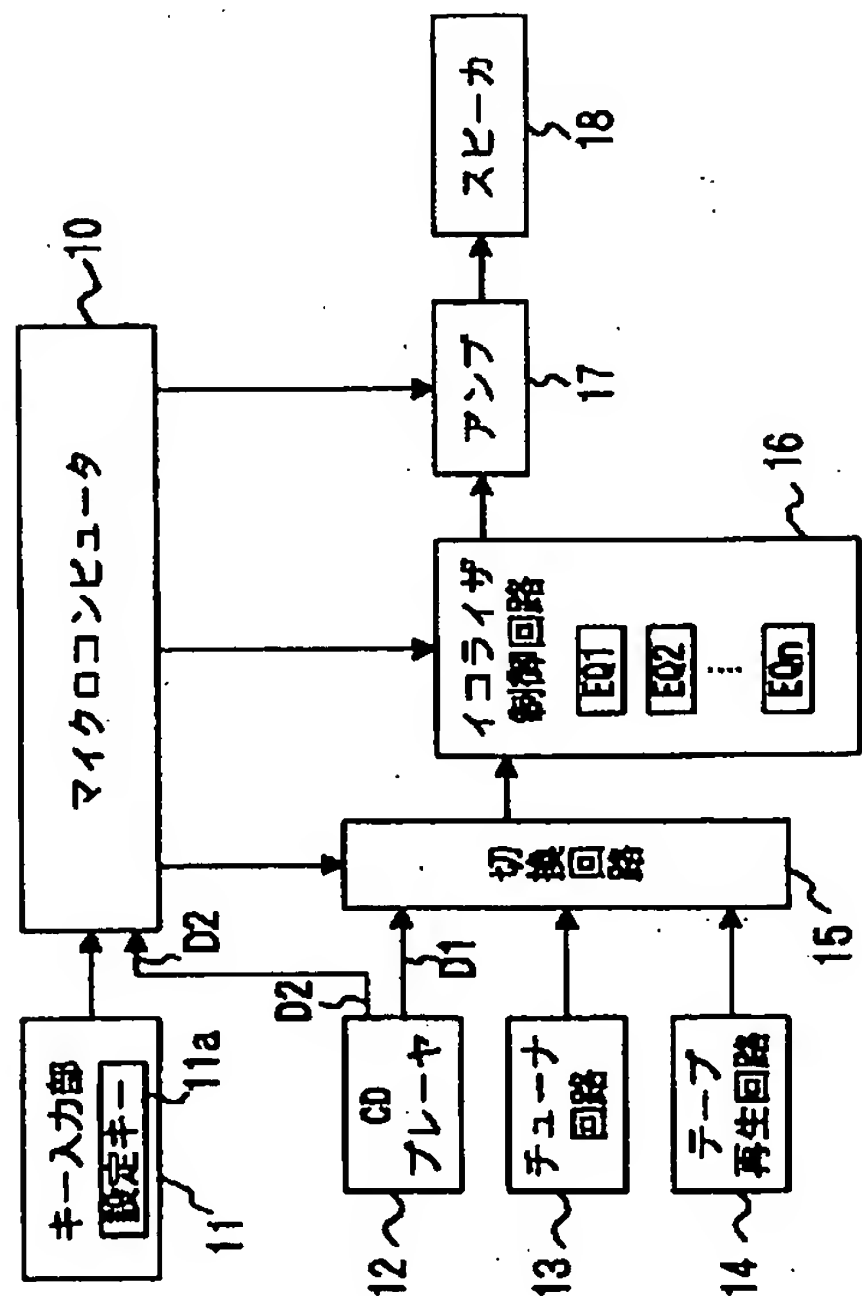
| | | | |
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(54)【発明の名称】 CD再生装置

(57)【要約】

【課題】再生したC Dの曲ジャンルに対応して自動的にイコライザの補正を行うことができるC D再生装置を提供することができる。

【解決手段】 装置全体を複合的に制御するためのマイコン10に、キー入力部11からの動作指令信号が供給されるように構成される。C Dプレーヤ12、チューナ回路13、テープ再生回路14の3系統の音源を有し、これらの出力が切換回路15に入力されている。切換回路15の後段にはイコライザ制御回路16とアンプ17が順次に接続され、アンプ17の出力端にスピーカ18が接続されている。イコライザ制御回路16は、C Dの記録情報を読み出して得られる音声信号に、予め設定された複数のイコライザ特性Q1〜EQnのデータが格納されたメモリの中から取り出された選択イコライザ特性EQ1〜EQnのデータに基づいて周波数特性の補正を自動的に行う。



【特許請求の範囲】

【請求項1】CDの記録情報を読み出して得られる音声信号に、予め設定された複数のイコライザ特性データが格納されたメモリの中から取り出された選択イコライザ特性データに基づいて周波数特性の補正を施して出力するCD再生装置において、

前記CDの記録情報を読み出して曲ジャンルコードが得られたときに、該曲ジャンルコードに対応して前記メモリの中から取り出された選択イコライザ特性データに基づく周波数特性の補正を、前記音声信号に施して出力するイコライザ制御手段を設けたことを特徴とするCD再生装置。

【請求項2】前記メモリの格納データは、複数の曲ジャンルコードのそれぞれに対応して予め設定されたイコライザ特性データを含んで構成されたことを特徴とする請求項1記載のCD再生装置。

【請求項3】前記メモリの格納データは、複数の曲ジャンルコードのそれぞれに対応して任意に設定されたイコライザ特性データを含んで構成されたことを特徴とする請求項1記載のCD再生装置。

【請求項4】前記メモリの格納データは、音声再生環境に対応して設定されたイコライザ特性データを含んで構成されたことを特徴とする請求項1記載のCD再生装置。

【請求項5】CDを複数枚備え、CD交換する際に曲ジャンルコードが得られたときに、前記メモリの中から当該曲ジャンルコードに対応するイコライザ特性データを取り出して周波数特性の補正を行うように構成することを特徴とする請求項1ないし請求項4のいずれかに記載のCD再生装置。

【請求項6】前記イコライザ制御手段は、デジタル信号の形態の音声信号にデジタルイコライザ特性の補正を施すように構成されたことを特徴とする請求項1ないし請求項5のいずれかに記載のCD再生装置。

【請求項7】前記イコライザ制御手段は、アナログ信号の形態の音声信号にアナログイコライザ特性の補正を施すように構成されたことを特徴とする請求項1ないし請求項5のいずれかに記載のCD再生装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、CD再生装置に関し、特に、CDの記録情報を読み出して得られる音声信号に、予め設定された複数のイコライザ特性データが格納されたメモリの中から取り出された選択イコライザ特性データに基づいて周波数特性の補正を施して出力するCD再生装置に関する。

【0002】

【従来の技術】CDは、取り扱いが便利で、曲のサーチや再生希望曲のアクセスを迅速に行うことができたり、光学式の無接触読取りであるために盤面の劣化が殆ど生

じない等の利点があると共に、高音質であるために広く普及していて、開発当初はそのサブコードエリアに主として曲番号データが記録されていたが、近年になって当該サブコードエリアに、CDのアルバムタイトル、曲タイトル、演奏者名（または演奏グループ名）等のテキストデータも記録されるようになり、さらに、曲ジャンルデータ、例えばクラシック曲、ポピュラー曲、ジャズ曲、ボーカル曲、カラオケ曲等々のデータも記録されるようになって来た。

10 【0003】このようなCDを再生する際には、CDの記録情報を読み取って得られた音声信号をスピーカやヘッドホンで再生する際には、スピーカやヘッドホンの周波数特性に対応してイコライザによる補正を施した状態で音響再生することが一般的である。また、イコライザによる補正は、曲ジャンルに合わせてその周波数特性を変化させることが望ましい。

20 【0004】例えば、クラシック曲の再生の場合には極端にゲイン増加する周波数帯域が無い方がユーザーの好みに合い、ボーカル曲の場合にはボーカル周波数帯域のゲインを増加させる方がユーザーの好みに合う等々である。なお、音響再生する環境が通常室内であるか特別の音響建築がされた室内であるか自動車内であるかによってもイコライザによる補正周波数帯域と補正量が異なっている。

【0005】従って、再生曲に合わせてイコライザ補正をその都度に設定することは非常に複雑な操作であり能率的でないために、イコライザ補正をある程度自動的に行うようにしたCD再生装置がある。

30 【0006】その第1例は、特開平2-55444に開示された技術であり、複数枚のCDが収納されたマガジンからCDを選択的に取り出して再生する形式（オートチェンジCDプレーヤ）のCD再生装置への適用例であって、マガジンに収納された複数枚のCDのそれぞれの「音量設定と周波数特性の補正」のデータをメモリに予め格納しておき、選択された1枚のCDを再生する際に当該メモリの中から対応する「音量設定と周波数特性の補正」のデータを取り出し、自動的に補正するように構成したものである。

40 【0007】また、複数のマガジンを備え、それぞれのマガジンの収納CDに対しても「音量設定と周波数特性の補正」のデータをメモリに格納しておけば、マガジン単位でのCD交換にも対応させることができる。

【0008】第2例は、特開平2-135961に開示された技術であり、自機で再生されたCDにおける「目次データとそのイコライザ特性データ」をメモリに格納して再生履歴データとして保存し、しかる後に当該CDが再生されたときに、再生履歴データを検索して対応データを見付け、見つかったデータに対応するイコライザ特性となるように補正するものである。

50 【0009】従って、以前に再生したCDの場合には、

イコライザ特性を再設定したりする必要がなく、しかも再生するCD毎に異なったイコライザ特性が簡単に再現できるので快適な音響再生を行うことができる。

【0010】さて、第3例としては、図4に示すような多機能再生装置(CDラジカセ)がある。即ち、装置全体を複合的に制御するためのマイクロコンピュータ(以下、「マイコン」と略称する)1が設けられ、このマイコン1に、キー入力部2からの動作指令信号が供給されるように構成されている。このキー入力部2は、各種動作指令用キーやテンキー等の多数のキー(図示せず)で形成されイコライザ設定キー2aを含んで構成されている。

【0011】また、CDプレーヤ3、チューナ回路4、テープ再生回路5の3系統の音源を有し、これらの出力が切換回路6に入力されている。この切換回路6の後段にはイコライザ制御回路7とアンプ8が順次に接続され、アンプ8の出力端にスピーカ9が接続されている。これら切換回路6、イコライザ制御回路7、アンプ8のそれぞれはマイコン1からの指令によって適宜に動作制御されるように構成されている。

【0012】イコライザ制御回路7は、その内部に複数(n個)のイコライザ特性データEQ1~EQnを格納するメモリを有し、当該データは、キー入力部2のイコライザ設定キー2a等によって任意にプリセットできるように構成されている。また、キー入力部2は、CDプレーヤ3におけるCD再生動作を指令したり、アンプ6におけるゲインの増減を指令したりするための複数キーで形成され、マイコン1に対して各種指令信号を送出するためのもので、CDプレーヤ3は、CDに記録された曲トラックの再生をマイコン1による動作指令に基づいて行い、アナログ音声出力信号を切換回路6に送出するものである。

【0013】また、切換回路6は、複数の入力系統のいずれかを選択してイコライザ制御回路5の入力端に出力するもので、即ち、CDプレーヤ3の出力信号とチューナ回路4の出力信号とテープ再生回路5の出力信号とのいずれかをマイコン1からの指令に基づいて出力するものである。

【0014】イコライザ制御回路5は、切換回路6から出力される信号にイコライザ設定キー2a等で設定されたイコライザ特性EQ1~EQnのいずれかでイコライザ補正するもので、イコライザ制御回路7の出力は、マイコン1からの指令に基づくゲインで増幅するアンプ8によって増幅され、その出力がスピーカ7に供給されて音響出力が得られるようになっている。

【0015】従って、CDプレーヤ3による再生を行う都度その曲の状態に合致するイコライザの特性をイコライザ設定キー2aによって入力することによってイコライザ制御回路7の中からイコライザ特性EQ1~EQnデータを取り出しそれに合わせて補正された状態で音

響再生することができる。

【0016】

【発明が解決しようとする課題】以上のような従来のCD再生装置は、前記第1例の場合には、CDを再生するに先立ってマガジンに収納された複数枚のCDのそれぞれの「周波数特性の補正」のデータをメモリに予め格納しておき、選択された1枚のCDを再生する際に当該メモリの中から対応する「周波数特性の補正」のデータを取り出して自動的に補正するように構成されているために、マガジンにCDを収納する際にメモリへの格納データ入力に手数が掛かりという難点がある。

【0017】また、前記第2例の場合には、自機で再生されたCDにおける「イコライザ特性データ」をメモリに格納して再生履歴データとして保存し、しかる後に当該CDが再生されたときに、再生履歴データを検索して対応データを見付け、見つかったデータに対応するイコライザ特性となるように補正するように構成されているために、2度目に再生されるCDについては補正を自動的に行うことができるものの、初回にメモリに格納するためのデータ入力に手数が掛かるという難点がある。

【0018】また、前記第3例の場合には、再生されているCDの曲ジャンルに応じてイコライザ設定キー等の操作キーを手動でもって操作することによってイコライザ制御回路の中からイコライザ特性データを取り出して所望のイコライザ特性となるように補正しているために、CDの曲ジャンルと複数のイコライザ特性データとの対応関係だけで補正を行うことができるものの、手動での補正であるために手数が掛かり、音響再生に専念できないという難点がある。

【0019】そこで、本発明の目的は、再生したCDの曲ジャンルに対応して自動的にイコライザの補正を行うことができるCD再生装置を提供することにある。

【0020】

【課題を解決するための手段】前述の課題を解決するため、本発明によるCD再生装置は、次のような特徴的構成を採用している。

【0021】(1)CDの記録情報を読み出して得られる音声信号に、予め設定された複数のイコライザ特性データが格納されたメモリの中から取り出された選択イコライザ特性データに基づいて周波数特性の補正を施して出力するCD再生装置において、前記CDの記録情報を読み出して曲ジャンルコードが得られたときに、該曲ジャンルコードに対応して前記メモリの中から取り出された選択イコライザ特性データに基づく周波数特性の補正を、前記音声信号に施して出力するイコライザ制御手段を設ける。

【0022】(2)前記(1)のメモリの格納データを、複数の曲ジャンルコードのそれぞれに対応して予め設定されたイコライザ特性データを含んで構成する。

【0023】(3)前記(1)のメモリの格納データ

を、複数の曲ジャンルコードのそれぞれに対応して任意に設定されたイコライザ特性データを含んで構成する。

【0024】(4)前記(1)のメモリの格納データを、音声再生環境に対応して設定されたイコライザ特性データを含んで構成する。

【0025】(5)前記(1)ないし前記(4)のいずれかの構成を、CDを複数枚備え、CD交換する際に曲ジャンルコードが得られたときに、前記メモリの中から当該曲ジャンルコードに対応するイコライザ特性データを取り出して周波数特性の補正を行うように構成する。

【0026】(6)前記(1)ないし前記(5)のいずれかのイコライザ制御手段を、デジタル信号の形態の音声信号にデジタルイコライザ特性の補正を施すように構成する。

【0027】(7)前記(1)ないし前記(5)のいずれかのイコライザ制御手段を、アナログ信号の形態の音声信号にアナログイコライザ特性の補正を施すように構成する。

【0028】

【発明の実施の形態】以下、本発明の実施の形態について図1ないし図3を用いて説明する。図1は、本発明によるCD再生装置を多機能再生装置(CDラジカセ)に適用した例の一実施の形態を示すブロック回路図であり、装置全体を複合的に制御するためのマイコン10が設けられ、このマイコン10に、キー入力部11からの動作指令信号が供給されるように構成されている。このキー入力部11は、各種動作指令用キーやテンキー等の多数のキー(図示せず)で形成されイコライザ設定キー11aを含んで構成されている。

【0029】また、CDプレーヤ12、チューナ回路13、テープ再生回路14の3系統の音源を有し、これらの出力が切換回路15に入力されている。この切換回路15の後段にはイコライザ制御回路16とアンプ17が順次に接続され、アンプ17の出力端にスピーカ18が接続されている。これら切換回路15、イコライザ制御回路16、アンプ17のそれぞれはマイコン10からの指令によって適宜に動作制御されるように構成されている。

【0030】イコライザ制御回路16は、CDの記録情報を読み出して得られる音声信号に、予め設定された複数のイコライザ特性EQ1~EQnのデータが格納されたメモリの中から取り出された選択イコライザ特性データに基づいて周波数特性の補正を施して出力するもので、CDプレーヤ12によって得られる曲データD1に付随したテキストデータD2をマイコン10によって記録情報を解読し「曲ジャンルコード」が得られたときに、該「曲ジャンルコード」に対応してイコライザ特性EQ1~EQnデータのメモリの中から取り出された選択イコライザ特性データに基づく周波数特性の補正を、切換回路15からの出力信号に施してアンプ17側に出力

するイコライザ制御手段を構成する。

【0031】また、イコライザ制御回路16の内部に複数(n個)のイコライザ特性データEQ1~EQnを格納するメモリを有し、当該データは、キー入力部11のイコライザ設定キー11a等を実行することによって任意にプリセットできるように構成されている。また、キー入力部11は、CDプレーヤ12におけるCD再生動作を指令したり、アンプ17におけるゲインの増減を指令したりするための複数キーで形成され、マイコン10に対して各種指令信号を送出するためのもので、CDプレーヤ12は、CDに記録された曲トラックの再生をマイコン1による動作指令に基づいて行い、データD1を切換回路15に送出すると共に、テキストデータD2をマイコン10に送出するものである。

【0032】切換回路15は、複数の入力系統のいずれかを選択してイコライザ制御回路16の入力端に出力するもので、即ち、CDプレーヤ12の出力信号とチューナ回路13の出力信号とテープ再生回路14の出力信号とのいずれかをマイコン10からの指令に基づいて出力するものである。

【0033】イコライザ制御回路5は、切換回路6から出力される信号にイコライザ設定キー2a等で設定されたイコライザ特性EQ1~EQnのいずれかでイコライザ補正するもので、イコライザ制御回路7の出力は、マイコン1からの指令に基づくゲインで増幅するアンプ8によって増幅され、その出力がスピーカ7に供給されて音響出力が得られるようになっている。

【0034】以上のように構成されたCD再生装置におけるCDプレーヤの処理の動作を図2に示すフローチャートを用いて説明する。先ずステップS1でCDのディスクロードが行われ、次のステップS2で光学式の読取りヘッドにおけるフォーカスサーボとトラッキングサーボとスピンドルサーボが行われ、次のステップS3でCDサブコード領域のTOCデータとTEXTデータの読み出しが行われる。

【0035】次のステップS4では、ステップS3で読み出されたTEXTデータとして曲ジャンルコードが有るか否かが判定され、Yesの場合にはステップS5で曲ジャンルコードの送信(CDプレーヤ12からマイコン10への信号伝達)が行われ、次のステップS6に進む。

【0036】ステップS6は、キー入力部11(イコライザ設定キー11a含む)の押操作があった場合に、例えばCDの現在再生中の次の番号の曲再生を開始指令する操作キーが押された等の場合にその動作指令を実行し、次のステップS7でディスク交換の要求があるか否かが判定され、Noの場合にはステップS6に戻され再度に操作キーが押された場合にその動作指令を実行する。そして、ステップS7でYesになったとき、換言すれば現在再生中のCDを交換する要求があった場合に

は、ステップS1に戻され、前述のステップS1～ステップS8が再度にわたって実行される。

【0037】次に、イコライザ制御回路16におけるイコライザ制御処理の動作を図3に示すフローチャートを用いて説明する。まず、ステップS9でイコライザ設定キー11aの入力が有るか否かが判定され、Yesの場合にはキー入力部11のイコライザ設定キー1.1a等によって設定されたイコライザ特性EQ1～EQnのデータのいずれか（設定されたデータ）によって切換回路15の出力に対してイコライザ補正が施される。

【0038】一方、ステップS9でNoの場合には、ステップS10に進み、曲ジャンルコードが受信（CDプレーヤ12で得られたテキストデータD2がマイコン10に信号伝達）されてCDプレーヤ12で得られたテキストデータD2に曲ジャンルコードが含まれている場合であるか否かを判定しNoの場合にはステップS9に戻され、Yesの場合には受信された曲ジャンルコードに対応するイコライザ特性をイコライザ制御回路16のイコライザ特性EQ1～EQnデータの中から探し、見つかったイコライザ特性のデータをもって切換回路15の出力信号にイコライザ補正が施こされることによって、CDの曲ジャンルコードによって自動的にイコライザ補正される。ステップS11及びS12の処理後はステップS9の処理に戻る。

【0039】なお、前述の形態は、イコライザ制御回路16は、アナログ信号の形態の音声信号にアナログイコライザ特性の補正を施すように構成されたものであるが、本発明はこれに限定されることなく、デジタル信号の形態の音声信号にデジタルイコライザ特性の補正を施すように構成してもよいことは勿論である。

【0040】また、本発明のCD再生装置は、1枚のCDを再生できるCDプレーヤのみならず複数枚のCDを収納したマルチディスクプレーヤにも適用できることは勿論である。

【0041】

【発明の効果】以上説明したように、本発明のCD再生装置は、CDの記録情報を読み出して曲ジャンルコードが得られたときに、該曲ジャンルコードに対応して前記メモリの中から取り出された選択イコライザ特性データに基づく周波数特性の補正を、前記音声信号に施こして出力するイコライザ制御手段を設けるように構成しているので、複数枚のCDを収納したマルチディスクプレーヤにおけるマガジンにCDを収納する際にメモリへの格

納データ入力が必要なくなる利点がある。

【0042】また、自機で再生されたCDにおける「イコライザ特性データ」をメモリに格納して再生履歴データとして保存し、しかる後に当該CDが再生されたときに、再生履歴データを検索して対応データを見付け、見つかったデータに対応するイコライザ特性となるように補正するように構成した場合に、2度目に再生されるCDについては補正を自動的に行うことができると共に、初回にメモリに格納するためのデータ入力の必要がなくなる利点がある。

【0043】更に、再生されているCDの曲ジャンルに応じてイコライザ設定キー等の操作キーを手動でもって操作することによってイコライザ制御回路の中からイコライザ特性データを取り出して所望のイコライザ特性となるように補正して、CDの曲ジャンルと複数のイコライザ特性データとの対応関係だけで補正を行うという非常に手数の掛かることを行う必要がないので、快適な音響再生に専念できるという利点がある。

【0044】従って、本発明によれば、再生したCDの曲ジャンルに対応して自動的にイコライザの補正を行うことができるCD再生装置を提供することができる。

【図面の簡単な説明】

【図1】本発明の一実施の形態によるCD再生装置のブロック回路図である。

【図2】図1中に示されるCDプレーヤの部分を中心とする処理動作を説明するためのフローチャートである。

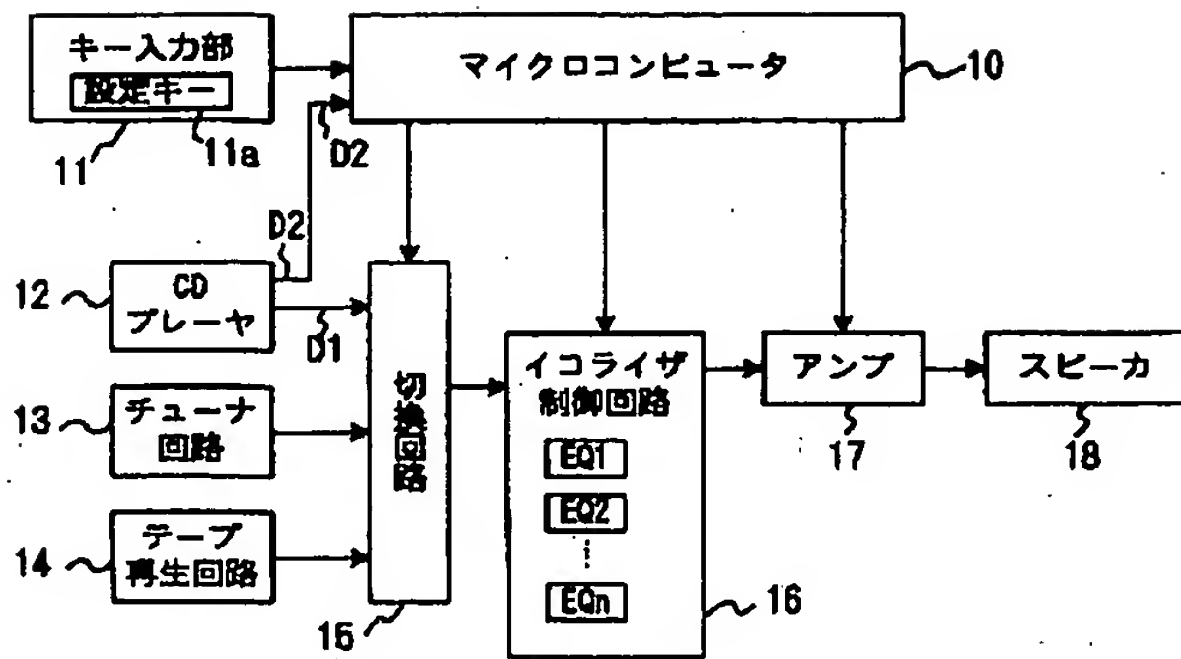
【図3】図1中に示されるイコライザ制御回路の部分を中心とするイコライザ制御処理動作を説明するためのフローチャートである。

【図4】従来のCD再生装置の一例の回路構成を示すブロック回路図である。

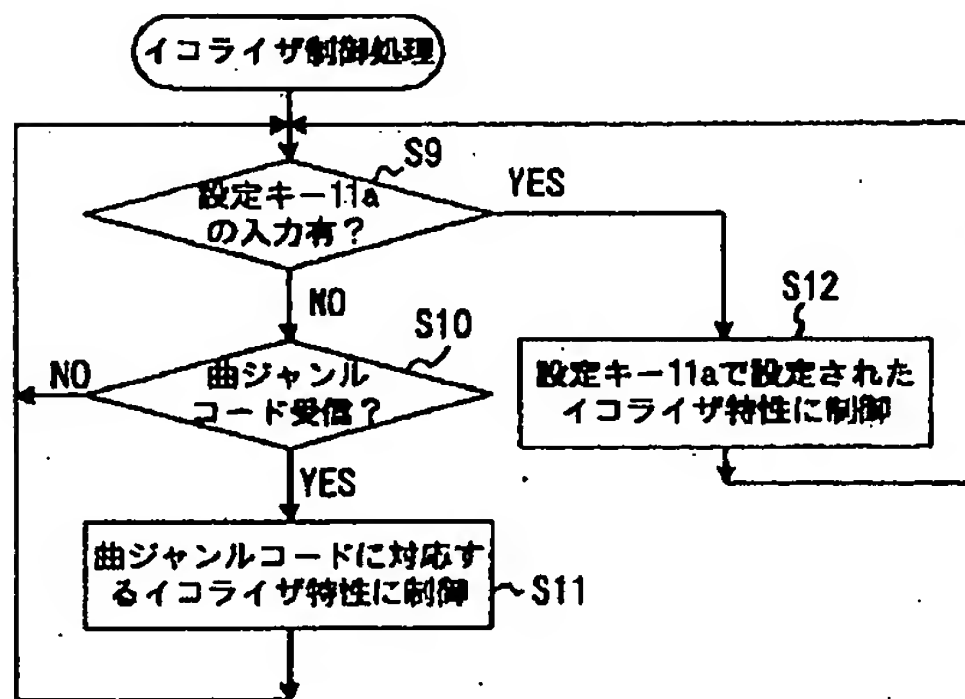
【符号の説明】

| | |
|-----|-----------|
| 10 | マイコン |
| 11 | キー入力部 |
| 11a | イコライザ設定キー |
| 12 | CDプレーヤ |
| 13 | チューナ回路 |
| 14 | テープ再生回路 |
| 15 | セレクト切換回路 |
| 16 | イコライザ制御回路 |
| 17 | アンプ |
| 18 | スピーカ |

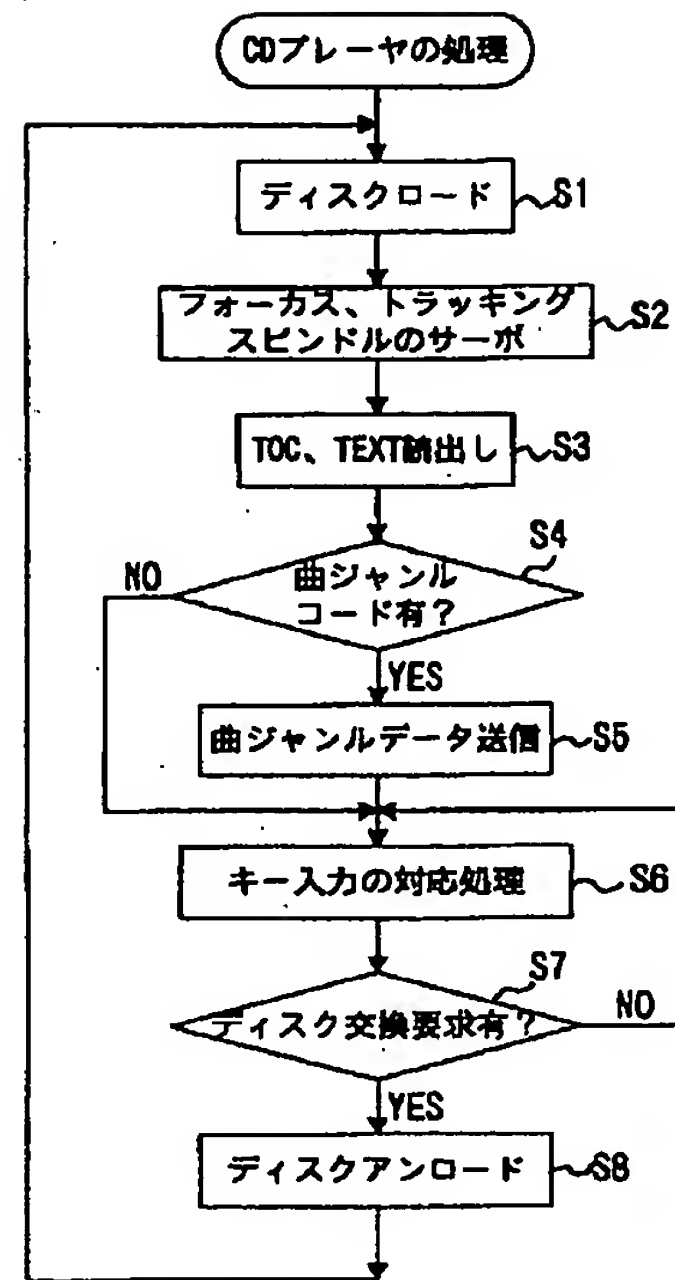
【図1】



【図3】



【図2】



【図4】

